

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SUE TROUP-PACKMAN

Appeal No. 1997-2097
Application No. 08/191,137

ON BRIEF

Before OWENS, WALTZ, and KRATZ, Administrative Patent Judges.
KRATZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's refusal to allow claims 9-18 as amended after final rejection. No other claims remain pending in this application.

BACKGROUND

Appellant's invention relates to a method for plating

aluminum alloy parts with iron so as to allegedly obtain a product that will satisfy adhesion, hardness and abrasion requirements without the use of copper cyanide and iron chloride in the process (specification, pages 1 and 2). An understanding of the invention can be derived from a reading of exemplary claim 9, which is reproduced below.

9. A process for plating aluminum alloy substrates with iron consisting of the following steps, each step followed by a water rinse:

(a) treating said aluminum substrate with a zincate bath to deposit an immersion layer of zinc metal thereon;

(b) plating on said zincate-treated aluminum surface a layer of nickel from an electroless nickel bath;

(c) electroplating on said nickel layer a layer of iron from an iron sulfate bath; and

(d) electroplating on said iron layer a layer of tin from an alkaline tin bath,

wherein said electroless nickel bath supersedes a copper cyanide bath and said iron sulfate bath supersedes an iron chloride bath, said electroless nickel bath and said iron sulfate bath as a first combination being substantially less toxic than said copper cyanide bath and said iron chloride bath as a second combination.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Ninagawa et al. (Ninagawa)	4,221,639	Sep. 09,
1980		

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Loch	4,346,128	Aug.
24, 1982		
Shemenski et al. (Shemenski)	4,545,834	Oct.
08, 1985		
Schultz et al. (Schultz)	4,567,066	Jan.
28, 1986 Ogata et al. (Ogata)	4,832,800	
May 23, 1989		
Herbert et al. (Herbert)	5,167,791	Dec.
01, 1992		
Carey, II et al. (Carey, II)	5,397,652	Mar. 14,
1995 ¹		
Yoshizaki	1,436,855	May
26, 1976		
(Published UK Patent Application)		

Klingenmaier, "Hard Iron Plating of Aluminum Pistons,"
Plating, p.741-746, August, 1974.

Claims 9, 10, 12, 14 and 16-18 stand rejected under
35 U.S.C. § 103 as being unpatentable over Klingenmaier in
view of Loch and Shemenski and optionally further in view of
Herbert. In addition to the above, the examiner further relies
on Schultz with regard to claim 11, Ninagawa with regard to
claim 13, and Ogata, Carey, II or Yoshizaki with regard to
claim 15 in separately stated § 103 rejections of those
appealed claims.

OPINION

¹ filed on December 10, 1993.

Upon review of the opposing arguments and evidence advanced by the examiner in the answer and appellant in the brief in support of their respective positions, we conclude that the examiner has not established a *prima facie* case of obviousness for the claimed subject matter.² Accordingly, we will not sustain the examiner's § 103 rejections for reasons set forth in appellant's brief and as further discussed below.

Klingenmaier (pages 741 and 742) teaches that aluminum engine pistons can be plated with iron in a manner such that the deposited iron is optimally adhered with a desired degree of hardness for wear resistance. Klingenmaier (page 745, second column) discloses that high hardness is the most important property of the deposited iron and may be obtained using a ferrous chloride bath operated at specified conditions. Klingenmaier teaches that the aluminum alloy is first coated with zinc, followed by copper obtained from a cyanide bath, then iron and finally tin with rinsing between the coating steps (pages 743 and 744).

² We note that it is the examiner who bears the initial burden of presenting a *prima facie* case of obviousness in rejecting claims under 35 U.S.C. § 103. See *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

Loch (column 5, lines 4-64) discloses the plating of aluminum substrates using a zincate protective coating followed by an electroless nickel coating (strike) and then an outer conductive metal plating, with tin being the only exemplified metal for that outer coating. Loch (column 7, lines 28-30) discloses that an "[e]lectroless nickel plate was found to be a superior barrier layer than was electrodeposited copper" for the obtention of a blister free tin plating of porous aluminum castings.

Shemenski (abstract) is directed to the formation of a ternary brass alloy coated steel wire element that may be used in reinforcing rubber articles. In making that coated steel wire element, Shemenski teaches that copper, zinc and iron may be deposited on the steel elements followed by heating to promote diffusion of the deposited metals to form the brass coating (column 3, line 58 through column 4, line 3). Shemenski discloses that the iron layer used in making the brass coated steel element may be deposited using electroplating solutions selected from "iron chloride solutions, iron sulfate solutions, iron fluoroborate solutions, and ferrous ammonium sulfate solutions" (column 4,

lines 43-46).

Herbert (abstract) evidences the formation of electroformed and/or electroplated iron with good ferro-magnetic properties using a titanium-palladium alloy as a preferred electrode. Herbert teaches that various iron salts may be used to obtain an iron plated substrate including ferrous chloride, ferrous ammonium sulfate, ferrous fluoroborate and ferrous sulfate (column 2, line 66 through column 3, line 6). Aluminum plated with nickel is one of several mandrel materials that is disclosed by Herbert as being suitable for the iron electrodeposition (column 5, line 63 through column 6, line 5).

The examiner correctly recognizes that Klingenmaier does not disclose the use of a nickel plating step using an electroless nickel bath prior to electroplating the iron layer and the use of an iron sulfate bath for depositing the iron as called for by the appealed claims herein (answer, page 4).

However, according to the examiner (answer, pages 5-7):

[I]t would have been obvious to one of ordinary skill in the art to substitute the Ni plating of Lock for the Cu strike coating of Klingenmaier, because of the advantages of superior interfacing taught by Lock in his comparison of the two

coatings, and Ni would have been expected to be a suitable intermediate layer for Klingenmaier's Fe coating because Ni and Fe are well known for forming alloys, hence they would have been expected to form a compatible interface where no adhesion problems would have been expected The relative toxicity of a solution is an inherent property and if the particular nickel bath is less toxic than Klingenmaier's Cu cyanide, that is just an additional reason for substituting Ni plating for the Cu coating, as would be recognized by a responsible and ordinary practitioner in the art.

While Klingenmaier taught that the FeCl_2 bath proved optimum for deposition of hard Fe on Cu, one of ordinary skill in the art would recognize that for a different intermediate layer, i.e. Ni, routine experimentation with known Fe plating solutions would have been needed to re-optimize as one would not expect different elements to behave identically with respect to Klingenmaier's previous optimization. Shemenski et al. teach (abstract) various Fe electroplating solutions . . . that can be used equivalently for deposition on metal It would have been obvious to one of ordinary skill to consider such teaching of alternate and equivalent Fe sources for electroplating, when optimizing through routine experimentation as discussed above. . . .

. . . Herbert illustrates electroplating iron, using baths containing iron salts . . . onto electrically conductive substrates, which include Al plated with Ni Hence, it would have been abundantly obvious to one of ordinary skill that given Lock's teachings as applied to Klingenmaier, one would have expected the Fe to be electroplated on the Ni undercoat with acceptable adhesion, as the prior art explicitly shows that it is known to do so. (emphasis in original).

The difficulty we have with the examiner's stated

position stems, in part, from the fact that the examiner has not pointed to any particularized teachings of the applied references which would have supported the examiner's reasoning and suggested that a skilled artisan would have been led thereby to substitute a nickel layer obtained from an electroless nickel bath for the copper layer of Klingenmaier coupled with a substitution of an iron sulfate bath for the iron chloride bath of Klingenmaier given Klingenmaier's particular interest in forming an iron plated aluminum alloy that had the requisite properties, such as hardness, necessary for an aluminum engine piston. We particularly note that the examiner has not shown where Loch evidences any concern with a process for forming an iron plated aluminum alloy, let alone such a plated alloy that would have the requisite hardness property of concern to Klingenmaier. Nor has the examiner shown how Shemenski's teachings regarding the formation of a ternary brass coated steel wire element for reinforcing rubber articles or Herbert's concern with electrodepositing iron with improved ferromagnetic properties would have been viewed by a skilled artisan as suggesting an equivalence of iron baths for the rather dissimilar process and product of Klingenmaier.

While the examiner suggests that a desire to avoid toxicities that would be associated with use of copper cyanide and iron chloride may have furnished a motivation for the proposed modification, we observe that the examiner has not shown where the applied references evince such a concern with the relative toxicity of copper cyanide and iron chloride that would have suggested the particularly proposed modification especially given the need for specific alloy properties as set forth in Klingenmaier.

In order for a *prima facie* case of obviousness of the claimed subject matter to be established, the prior art as applied must be such that it would have provided one of ordinary skill in the art with both a suggestion to carry out appellant's claimed invention and a reasonable expectation of success in doing so. See *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). "Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure." *Id.* The mere possibility that the prior art could be modified such that appellant's invention would result, is not a sufficient

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basis for a *prima facie* case of obviousness. See *In re Brouwer*, 77 F.3d 422, 425, 37 USPQ2d 1663, 1666 (Fed. Cir. 1996); *In re Ochiai*, 71 F.3d 1565, 1570, 37 USPQ2d 1127, 1131 (Fed. Cir. 1995).

From our perspective, the examiner has not convincingly explained where the motivation may be found in the combined teachings of the references to support the modifications of Klingenmaier as proposed by the examiner. This motivation appears to come solely from the description of the invention at issue herein in appellant's specification. Thus, on this record, we conclude that the examiner used impermissible hindsight when rejecting the claims in the manner set forth in the answer. See *W.L. Gore & Associates v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984); *In re Rothermel*, 276 F.2d 393, 396, 125 USPQ 328, 331 (CCPA 1960). We note that the additional references applied against claims 11, 13 and 15 do not cure the above-noted deficiencies. Accordingly, on this record, we will not sustain the examiner's stated rejections.

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CONCLUSION

The decision of the examiner to reject the appealed claims under 35 U.S.C. § 103 as stated in the separate rejections set forth in the answer is reversed.

REVERSED

TERRY J. OWENS)	
Administrative Patent Judge)	
)	
)	
)	
)	BOARD OF PATENT
THOMAS A. WALTZ)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
)	
)	
)	
PETER F. KRATZ)	
Administrative Patent Judge)	

PFK:lmb

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APPLICATION NO.

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DECISION: **ED**

Prepared By:

DRAFT TYPED: 22 Aug 01

FINAL TYPED: